November 2001 **Vol. XXXIII, Number 5**

Tsunami Newsletter

INTERNATIONAL TSUNAMI INFORMATION CENTER - ITIC

Richard "Dick" Hagemeyer
1924 - 2001

With deep sadness we report that Dick Hagemeyer passed away on October 25. Dick had been the National Contact for the United States to The International Coordinating Group of the Tsunami Warning System in the Pacific (ICG/ITSU) since 1983. He was also Manager of the US Tsunami Program since that time. He accepted both positions on his return to Honolulu, to fill the position of Pacific Regional Director of the US National Weather Service. His contribution to tsunami programs both national and international were an important aspect of his 51 year career with NOAA and the National Weather Service.

Dick was Chairman of ICG/ITSU from 1987 to 1993, being elected during ITSU XI and serving until Session XIV. He is pictured here with Helen and Yuri Oliounine in Ensenada during ITSU XIII in 1991.

As Scott Gudes (Acting Undersecretary of NOAA) stated in his eulogy, "Dick had three loves in his life—his wife, Helen, the people and culture of the Pacific and the National Weather Service...He will be sorely missed for his leadership, his enthusiasm for the National Weather Service and for NOAA. Jack Kelly, Assistant Administrator for the Weather Services, and I, along with the entire NOAA family, mourn the loss of this great man".

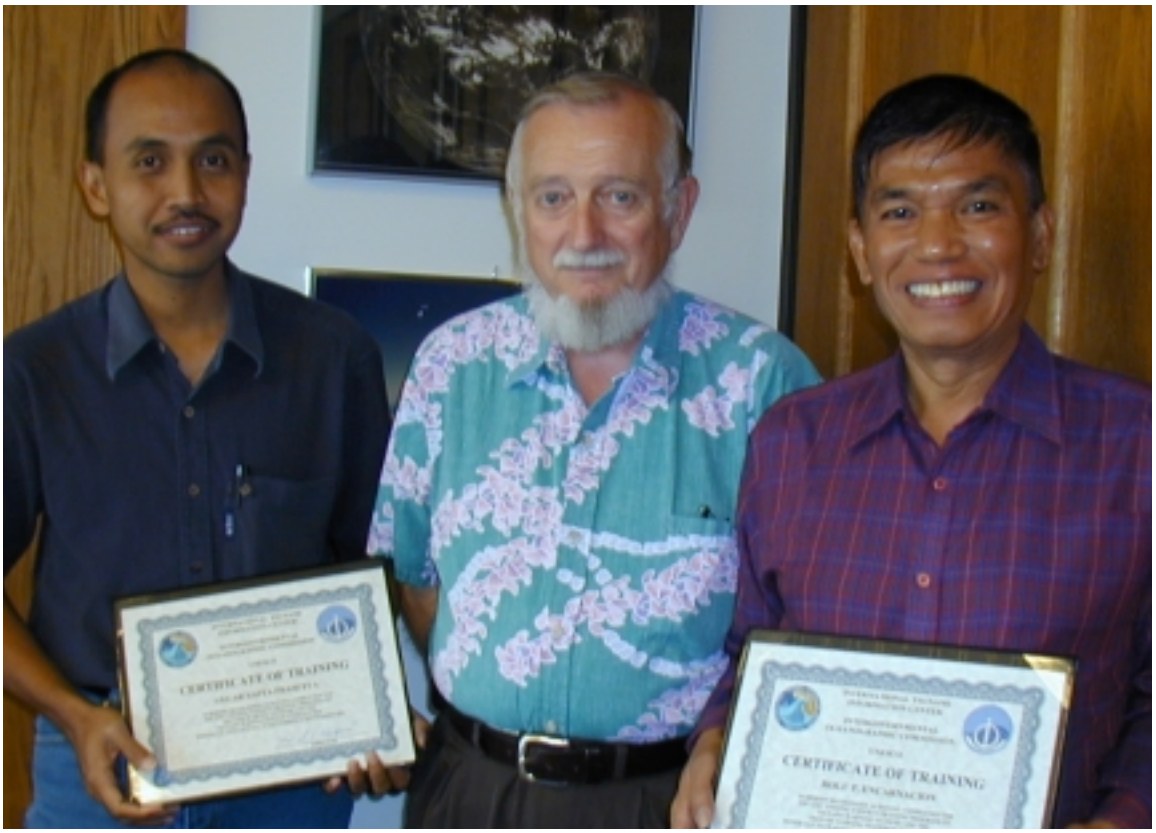
Likewise, those involved in the Tsunami Program will miss him. He actively supported Viacheslav (Slava) Gusiakov's work on the Historical Tsunami Database and encouraged it at every turn. Dick was known to verify runup heights himself, joking that it 'kept him off the streets."

"With his support, old, slow minicomputers were replaced by high speed workstations and the real time seismic data, being recorded in analog on space-consuming drum recorders, was digitized and displayed on computer monitors", recalls Mike Blackford in regards to his working with Dick during his days at PTWC.

"He was a very good mentor for me, he really felt like a member of the family"— expressed Chip McCreery.
Comments and a photo montage of memories have been posted on the Web. (http://205.156.54.206/com/hagemeyer/). Comments recall his consideration, his dedication, his boots, his red Firebird, his corporate knowledge, his preference for Bombay gin, his (and Helen's) hospitality and his easy-going Aloha wear.

Funeral services were held on November 2, at Holy Nativity Episcopal Church. In lieu of flowers, Helen asked that contributions be made to the Dick and Helen Hagemeyer Undergraduate Scholarship in Meteorology, c/o The American Meteorological Society, 45 Beacon Street, Boston, MA 02108-3693.

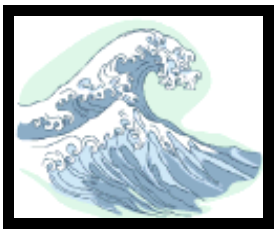
Visiting Expert Program, Sept 12-29



During September, Gegar Sapta Prasetya of the Indonesia Agency for Marine and Fisheries Research in Jakarta (left) and Rolu Encarnacion from PAGASA in Quezon City, Philippines (right), were in Hawaii to participate in the ITSU Visiting Expert Program. During their stay, they were introduced to tsunami activities in Hawaii. This included discussions with scientist on current research and included observing first-hand the operations of the Pacific Warning Center in Ewa Beach. They visited sites of tsunami occurrence on the North Shore of Oahu and along the East Coast of the Big Island of Oahu. They met with State and local civil defense agencies and others involved in local mitigation efforts. They also spoke about the tsunami conditions and mitigation efforts in their countries.

Gegar discussed research that is ongoing in Indonesia. He explained how the patterns of seismicity in the region, based on recent data, have contributed to knowledge of the tectonics of the region. This knowledge is being used in risk assessment. In particular, studying the earthquakes that occur in the Makassar Strait, he indicated why subsidance and directivity play a major role in the tsunami history of the West Coast of Sulawesi. Gegar also spoke of his research into the physics surrounding the eruption of Krakatau in 1883, and present day monitoring of the area. He showed slides of the hydraulic lab experiments that have simulated explosions in an attempt to better understand the mechanics of what occurred in 1883.

Rolu discussed how warnings are disseminated in the Philippines. He explained the dissemination of messages and the coordination between agencies distributing messages. Whereas PHILVOCS maintains the seismic network to warn of local earthquakes, tsunami messages are going through PAGASA (the Philippine Weather Bureau) which is targeting areas at risk from storm surge for improved tsunami warning. Because the population is attuned to typhoon warnings, the procedures and infrastructure of tsunami warning follow along the same lines as for storm surge warnings. He discussed the problems of coordinating tsunami warnings at local levels and the differences between typhoon warnings and tsunami warning that need to be addressed.



TSUNAMI MITIGATION BEYOND 2000

The International Workshop

CARTAGENA, COLOMBIA
5-6 October 2001

On the Friday and Saturday prior to start of ITSU XVIII, an international workshop was held. It was organized jointly by the IUGG Tsunami Commission and ICG/ITSU in co-operation with the IOC and the Colombian Ocean Commission. The workshop co-conveners were Dr. Viacheslav Gusiakov, Dr. Francois Schindele and Professor Hansjurgen Meyer. It was the last of three workshops that have been jointly organized by the IUGG/TC and ICG/ITSU to consider the state of the art in tsunami research at the turn of the century and to lay a groundwork for research into the future. On Friday, the morning session was "Tsunami Mitigation and Risk", while the afternoon session entitled "Tsunamis in Colombia and South America" was in Spanish. Saturday's session, "Tsunami Seismotectonics and Related Phenomena" was followed by a roundtable discussion of methodologies. A volume of abstracts was distributed at the workshop. The Table of Contents alphabetically lists the following abstracts:

Arreaga, P., "A Study of the tsunami in the Ecuador South Coast".
Gonzalez, A., "National system to assist and prevent disasters".
Gorziglia, H., "The Chilean tsunami warning system and El Salvador Event: Lessons and experiences".
Gusiakov, V.K., "June 23, 2001 Peru tsunami: Analysis of data accessibility, quality and completeness".
Hagemeyer, R.., "US experience in implementing a National Tsunami Hazard Reduction Program".
Ibrahim, G., "Tsunami hazard in Indonesia".
Kaistrenko, V., Klyachko, M., Nudner, I, Pelinovsky, E and I Zyskin, "Developing tsunami mitigation program of the Russian Federation".
Kim and Lkhausen, "Seismotectonics of Northeast Asia and seismicity of the Korean Peninsula".
Lee and Cho, "Local tsunami warning system of KMA".
Levin and Sassorova, "Temporal regularity in the Pacific tsunami occurrence: A possible application for the tsunami warning and mitigation".
Llano, G., "Performance guide in case of natural disaster".
Lorca, E., "Tsunami inundation maps, a fundamental tool for tsunami preparedness in Chile".
Maul, G., "Elements of a tsunami warning system for the Intra-Americas Sea".
Mercado, A., "The Puerto Rico tsunami warning and mitigation program".
Moreno, J., "Program of community education for the disaster prevention".
Nosov. M., Kolesov, S. and S. Skachko, "Tsunami mitigation and source processes description validity".
Puspito, N., "Present status of tsunami mitigation studies in Indonesia and its future program".
Quiceno, A, Ortiz, M and L. Caballero, "Colombian Pacific coast tsunami inundation maps".
Rabinovich, A and F. Stephenson, "Tsunami risk for the coast of British Columbia".
Reymond, D. and E. Okal, "Rapid determination of focal mechanism: A project to improve tsunami warning".
Sassorova, E., Morozov, V., Levin, B., Didenkulov, I and Y. Karlik, "Hydro-acoustical signals from near-shore submarine earthquakes: Perspectives for early tsunami warning".
Schindele, F., "The International Coordination Group for the Tsunami Warning System in the Pacific".
Schindele, F. and H. Hebert, "Tsunami hazards in the Marquesas Islands (French Polynesia): Numerical modeling of trans-Pacific events".
Tejeda, J., "Tsunami occurred on June 23, 2001 at the southern part of Peru".
Vargas, J., "Reorientation of urban growth in Tumaco Project".
Zahibo, N. and E. Pelinovsky, "Tsunami data in the French West Indies".

ITSU XVIII, CARTAGENA, COLOMBIA OCTOBER 8-11, 2001

by Mike Blackford

The 18th meeting of the International Coordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) took place in Cartagena, Colombia from the 8th through the 11th of October 2001. The meeting addressed a number of issues dealing with the operations of the Warning System and its role outside of the Pacific basin. Other topics that were discussed include archiving in the Historical Tsunami Data Base (HTDB) information on the occurrence of past tsunami and the archiving of marigrams of these tsunami, various measures for heightening public awareness of the tsunami hazard, and an evaluation and future of the Intergovernmental Oceanographic Commission's (IOC's) tsunami program itself. This article cannot cover every discussion held at the 18th meeting and those interested in more detail are encouraged to obtain a copy of the report of the ICG/ITSU 18th Session when it is published next year. The Tsunami Newsletter will report its availability.

Charles McCreery, Director of PTWC, briefed the Group on the status of the ITSU Communications Plan (COMM PLAN). He informed the Group that an update to the 12th Edition of the COMM PLAN will be distributed to the ITSU participants by the end of 2001 and that a new edition in both electronic and hardcopy formats will be prepared and distributed to the participants during the coming intersessional period. A number of the delegates present at the meeting stated that they were having problems receiving the PTWC messages over the formal lines of communications specified in the COMM PLAN. The Group recommended that participants having such problems should explore with PTWC the possibility of using alternatives to the formal communications links such as the U.S. Weather Service's EMWIN system.

Dr. McCreery also briefed the Group on the recommendations of the Working Group on procedures for issuing warnings, watches, and cancellations. The Working Group recommended that the magnitude criterion used to determine the type of message to be issued for a particular earthquake be changed from the surface wave magnitude, M*s*, to the moment magnitude, M*w*. This change was recommended because adequate data is now available to PTWC in real time for a timely determination of M*w*. The Working Group also recommended raising the threshold for issuing regional warning/watch messages from magnitude 7.5 to 7.8. The Warning Center would issue a new type of message; a local/regional warning for events between 7.5 and 7.8. It would continue to issue information bulletins for Pacific basin, or near basin, events with magnitudes between 6.5 and 7.5. Also, only information bulletins would be issued to participants throughout the Pacific for events equal to, or greater than, 6.5 that clearly occur in the marginal basins of the western Pacific.

With regard to the marginal basins, and to the ITSU Area of Responsibility (AOR) in general, Mr. Blackford, Director of the ITIC, proposed that the ITSU AOR be defined as that area which is within 200 kilometers of the Pacific coasts of the Americas, Antarctica, Australia, and Asia including all of Indonesia. An inner boundary, 200 kilometers away from the main basin of the Pacific would be aligned along the island chains that lie between the main basin and the marginal basins. The Group accepted these recommendations and proposals.

Dr. Gusiakov, Chairman of the IUGG Tsunami Commission, presented his latest version of the Historical Data Base for the Pacific (HTDB/PAC). This version meets the recommendations made at the 17th meeting of the ICG/ITSU. The database lists both the sources (about 1450) and tsunami runup values (over 6000) for events occurring between 47 BCE and 2000 CE in the area from 80E to 70W, between 65N and 65S. A new mirror site for the online database was established on the NOAA Pacific Marine Environmental Laboratory website in August 2001. Work still needs to be done to improve the quality and completeness of the data, which was taken from a number of earlier catalogs of varying quality. Dr. Gusiakov hopes to enlist the aid of several national or regional volunteers who can assist him with this verification effort. He also hopes to have a training workshop for these volunteers in conjunction with one of the international tsunami meetings or symposia planned for the forthcoming intersessional period.

Mr. Blackford reported on the activities of the Visiting Experts Program since the last meeting of the ICG/ITSU and he provided some suggestions on tsunami awareness education in general. Two experts per year, intentionally selected from Member States adjacent to each other, were chosen to participate in a two week long training program designed to promote the establishment of regional tsunami warning systems or at least to foster stronger regional cooperation and timely exchange of information during potential tsunami events. The four experts who participated in the program during the intersessional period went away with a better understanding of how ITSU operates and with ideas for proactively improving their access to information during events.

Those present in Cartagena included (left to right): George Maul, Michio Takahashi, Julian Reyna, Duk Kee Lee, Young-Soon Cho, Hugo Gorziglia, Michael Blackford, Alexandra L. Quiceno, V. Gusiakov, Francios Schindele, Orlando Malaver, Nanang Puspito, A. Youlton Rodrigo Nuñez, Mikhail Nosov, Wilfried Strauch, Jose Tejeda, J.B. Shepard, Fred Stephenson, Patricia Arreaga Vargas, Mike O'Leary, Elena Sassorova, Iouri Oliounine, Mrs. Levin, Eduardo Lazo, 2 interpreters, Iván , and Boris Levin.

Mr. Blackford described a number of alternatives that might be employed to increase and sustain awareness in tsunami prone areas. He suggested that persons who participate in the Visiting Experts Program be asked to report back periodically for some time after their training on how they have used this training in their home States. He reported that the ITIC receives many requests for the educational material developed by the ICG/ITSU not so much for curricula per se, but for reference material used to develop lesson plans within the school's standard curricula. Nearly all of the 20,000 copies of the "Tsunami, the Great Waves" booklet have been distributed during the intersessional period with nearly a quarter of the total going to Papua New Guinea in the aftermath of their disastrous tsunami of 1998. Another suggestion made by Mr. Blackford was to try to get government authorities in areas struck by tsunamis to declare some period of time- a day, a week, or a month- around the anniversary of the tsunami disaster as a period of tsunami awareness. During this period lectures or other presentations on the tsunami hazard could be made at public meetings or school assemblies. Finally he suggested that in areas struck by tsunamis some form of memorial could be erected that would not only commemorate the disaster but it would also contain plaques describing the hazard and it may even provide a safe haven during future tsunami flooding.

During the ICG/ITSU meeting a Working Group was established to quickly review the latest version of a proposal to establish a regional tsunami warning system for the Intra-Americas Seas area. This group met a number of times outside of the main meeting's hours to discuss the merits of the system in general and to address some issues that have a strong bearing on the need for such a system. Of particular concern was the quality of the data on past events in the area, the response time for local events, and possibility of duplication of programs already in existence in the region. Dr. Shepherd of Trinidad described a number of errors in the catalog provided with the proposal. He also indicated that all tsunamis in the region are local in nature and a sophisticated warning center would not have enough time to be effective in such events. The main emphasis of any tsunami warning system in the area should be on heightening public awareness of the hazard. Dr. Shepherd felt there might already be sufficient programs in place that address the public awareness issue. Other members of the Group pointed out that while the Lesser Antilles subregion may be in good order, other areas within the Intra-Americas Sea region are sorely lacking in such programs. Some of these areas have experienced very serious tsunamis in the last 150 years that have taken many lives and caused considerable damage. The ICG approved the proposal in principle and recommended that another Working Group be established to address these outstanding issues in time for regional IOC meetings that will be held in the area in 2002. — Continued next page.

ITSU XVIII, CARTAGENA, COLOMBIA OCTOBER 8-11, 2001, continued

The Group made three recommendations during the 18th ICG/ITSU meeting. The first recommendation dealt with the enhancement of sea level measuring systems. Real time, or near real time, measurement systems are vital to the warning system not only because they provide information on the existence or non-existence of a destructive tsunami following a large seismic event, but they are used to terminate a regional warning and watch sequence that is put into action by the seismic event. The longer it takes to receive information on the status of a tsunami the longer the warning and watch is in effect and the more area emergency managers are having to make decisions on appropriate actions to take regarding the warning. The group recommended that the Member States review the state of their existing water level measurement systems, improve their operation including making the data available to PTWC in at least near real time, and consider installing deep ocean or island gauges in their areas so that quality data with a station spacing of about 500 kilometers would be available to the Warning Center for analysis.

A second recommendation by the Group involved the establishment of a Working Group for developing international standards for tsunami signs and symbols. This recommendation arose out of consideration of the recommendations made at the international tsunami workshop held in Cartagena just prior to the ICG/ITSU meeting. The Group recommended that the Working Group develop a set of internationally standardized signs and symbols to be used in the field, in educational material, and on tsunami inundation and evacuation maps. The Working Group should present a preliminary draft of their effort at the ITSU Officers meeting in early 2003 and they should present a final draft at the 19th ICG/ITSU meeting later in 2003 for the Group's consideration and approval.

The final recommendation by the Group addressed the program of work and budget for the forthcoming intersessional period in 2002 and 2003. Items addressed include support for the ITIC in Honolulu and its Associate Director in Chile, preparations for the next ICG/ITSU meeting, funding for travel to other meetings and programs by the ICG/ITSU officers and experts and the IOC Secretariat, funding for finalizing a tsunami press kit and a French version of the tsunami glossary, and support for meetings and workshops in Petropavlovsk-Kamchatskiye, Russia and in Indonesia commemorating the 120th anniversary of the Krakatau eruption.

ITIC Associate Director, Rodrigo Nuñez, and a technician helping to set up equipment for a presentation at ITSU XVIII.

CONFERENCES, WORKSHOPS, and COURSES

DECEMBER 2001

December 3-7 (Monday-Friday), *Combined Humanitarian Assistance Response Training Course (CHART),* Koolau Golf Club in Kaneohe, HI. The Center of Excellence in Disaster Management and Humanitarian Assistance (COE). A certificate program offered once a year, free of charge in Hawaii. The main learning objective is to prepare course participants for leadership responsibilities in complex humanitarian emergencies and disasters. For more information or to obtain an application visit COE's Web site http://coe-dhma.org (Follow the Calendar link to "event details") Or call Winnie Yamaguchi for more details: (808) 433-1427.

December 4-6 (Tuesday-Thursday), *Disaster Risk Reduction Hemispheric Conference*, San Jose, Costa Rica.
In follow-up to the Third Summit of the Americas held in Quebec City in April of 2001, the Governments of Costa Rica and the United States are co-hosting this hemispheric conference which will focus on the Disaster Risk Reduction, with emphasis on disaster prevention and mitigation activities as they relate to development (disaster response and preparedness issues will not be addressed.) For complete information consult the conference Web site: http://www.ofdalac.org/summit.

2002

January 28-29 (Monday-Tuesday), *Disaster Management 2002: Preparation, Response, Recovery and Mitigation.* Harrah's Las Vegas, Nevada. Presented by The National Institute for Government Innovation and sponsored by IAEM, IBHS, Terrorism Response Association International and National Terrorism Preparedness Institute. This event will bring together all disciplines involved in both natural and man-made disasters including emergency mangement, law enforcement, fire, emergency medical, small and large business communities and insurance. Includes pre- and post-conference workshops. The Web site is: www.nigi.org. Call: (888) 670-8200 for more information.

May 20-22 (Monday-Wednesday), *The Seventh International Conference on Remote Sensing for Marine and Coastal Environments*. Miami, Florida, This international conference focuses on the application of remote sensing and advanced geospatial information technologies to address real-world problems and improve decision-making in marine, inland water, and coastal environments. The conference also explores implementation strategies by bringing scientists and technologists together with decision-makers and end-users to examine how they can work in concert to increase the responsiveness of these technologies to specific information needs. For more information see www.erim-int.com/CONF/marine/MARINE.html.

May 28-30, (Tuesday-Thursday), *Second Tsunami Symposium.* The Tsunami Society. P.O. Box 37970, Honolulu, Hawaii 96817 USA. Registration Fee $150 (member); $300 (non-member) Contact Person: Mr. James Lander (303) 497-6446, email: JFL@ngdc.noaa.gov. For more information see http://www.ccalmr.ogi.edu/STH/symp2.html

July 21-26 (Sunday-Friday), *PACON 2002 : The Ocean Century.* Makuhari Messe [Nippon Convention Center] Chiba, Japan. Contact information: PACON International, PO Box 11568 Honolulu HI 96828-0568 USA, pacon@hawaii.edu, http://www.hawaii.edu/pacon. Deadline for abstract submittals is February 15, 2002.

October 16-18 (Wednesday-Friday), *LACDE 2002: 5th International Conference.* Shanghai, China. Local Authorities Confronting Disasters and Emergencies. For details, please contact:
Mr. Avi Rabinovitch, Secretary General / LACDE Secretariat, P.O. Box 20040 - Tel Aviv, Israel
Tel: +972-3/695-5024 & 691-9241, Fax: +972-3/691-6821
E-mail: ulais@netvision.net.il (from http://www.ulai.org.il/lacde.htm)

October 21-25 (Monday-Friday), *VII International Congress on Earth Sciences and Symposium of International Association of Geodesy. International Symposium on Recent Crustal Deformations in South America and Surrounding Areas (IAG).* Diego Portales Conference Center, Santiago, Chile. Organized by the Geographic Department (Subdireccion Geografica) of the Military Geographic Institute of Chile, Nueva Santa Isabel No. 1640, Santiago, Chile. Tel (56-2) 460 6813, e-mail: cct2002@igm.cl. Abstracts are due before April 2002.

SUMMARY OF PACIFIC BASIN EARTHQUAKES

Occurring September-October 2001

With surface wave or moment magnitudes greater than or equal to 6.5, with a depth no greater than 100 km, or an event for which a TIB or RWW was issued. (Ms and Mw based on NEIC records from USGS or Harvard)

DATE	LOCATION	TIME (UTC)	LAT.	LONG.	DEPTH (km)	Ms	Mw	PTWC ACTION	ACTION (UTC)	Tsunami
September 11	Irian Jaya, Indonesia	14:57	0.6 S	133.2 E	19	6.4	6.6 (USGS)	—		No
October 8	Off E. Kamchatka Coast	18:14	52.6 N	160.3 E	49	6.4	6.5 (HRV)	—		No
October 12	Vicinity, South of Mariana Islands	15:02	12.8 N	144.9 E	37	6.8 (PTWC)	7 (USGS)	TIB*	15:33	No
October 19	Banda Sea, Indonesia	03:28	4.1 S	123.9 E	10	7.0	7.5 (HRV)	TIB	04:02	No
October 21	East Coast of North Island, New Zealand	00:29	37.0 S	178.9 E	17	6.7	6.7	TIB	00:58	No
October 31	New Britain Region	09:10	5.9 S	149.8 E	36	6.7	7 (USGS)	TIB	09:42	No

***TIB**=Tsunami Information Bulletin

INTERNATIONAL TSUNAMI INFORMATION CENTER (ITIC)

Located in Honolulu, the **International Tsunami Information Center (ITIC)** was established on 12 November 1965 by the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO). In 1968, IOC formed an International Coordination Group for the Tsunami Warning System in the Pacific (ICG/ ITSU).

The Member States are presently:
Australia, Canada, Chile, China, Colombia, Cook Islands, Costa Rica, Democratic People's Republic of Korea, Ecuador, Fiji, France, Guatemala, Indonesia, Japan, Mexico, New Zealand, Nicaragua, Peru, Philippines, Republic of Korea, Singapore, Thailand, Russian Federation, United States of America, and Western Samoa.

http://www.shoa.cl/oceano/itic/frontpage.html

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